Abstract Submitted
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Coagulation growth kinetics of nanoparticles in non-stationary plasma.[1] VLADISLAV VEKSELMAN, Princeton Plasma Physics Laboratory, MIKHAIL SHNEIDER, Princeton University, YEVGENY RAITSES, Princeton Plasma Physics Laboratory, LABORATORY FOR PLASMA NANOSYNTHESIS TEAM — Coagulation growth kinetics of nanoparticles in plasma is affected by inter-particle electrostatic forces due to charging phenomenon. In stationary plasmas, flux of plasma electrons reaching nanoparticles usually dominates over other charge carriers and particles acquire the so-called floating potential. Unipolar charging of particles results in retardation of nanoparticles growth and may result in limitation on a particle size. In current work we demonstrate opposite effect that is an enhancement of the particles growth in atmospheric pressure non-stationary arc discharge. Modeling of the growth kinetics revealed the formation of bipolar charge distribution of nanoparticles. As a result, Coulomb forces reversal from repulsive to attractive between nanoparticles promotes enhanced growth rates. This mechanism may explain an experimental observation of the grow of large micron size particles in the carbon arc.

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